

## ORIGINAL ARTICLE

# How do microbiology consultants undertake their jobs? A survey of consultant time and tasks in South West England

T Riordan, K Cartwright, M Logan, R Cunningham, S Patrick, T Coleman

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See end of article for authors' affiliations

Correspondence to:  
Dr T Riordan, Public Health Laboratory, Church Lane, Heavitree, Exeter EX2 5AD, UK; TRiordan@PHLS.nhs.uk

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**Aims:** To measure the total consultant medical microbiologist (CMM) weekly workload, to identify time spent on different activities, and to differentiate those tasks that were viewed by a consensus of consultants as core activities from those that could be accorded a lower priority.

**Methods:** A self administered questionnaire completed by consultant medical microbiologists in the Public Health Laboratory Service South West Group.

**Results:** Reported hours worked by respondents ranged from 41 to 65 hours each week, excluding on call activities. Eleven of 20 respondents reported working in excess of 48 hours each week. There was no correlation between hours worked and laboratory workload as measured by numbers of specimens. Clinical liaison, result authorisation, infection control, and management activities took up most time. Working practices varied widely between individuals, partly reflecting their differing roles in the laboratory. A consensus was reached regarding the relative importance and priority of many regular CMM activities.

**Conclusions:** Consultant microbiologists can identify, with consensus, both high and lower priority activities in their daily practice. If such clinical priorities can be more widely agreed across the profession, this would provide a rational approach to workload control.

In the past 10 years there has been a considerable expansion in the numbers of medical consultants in acute specialities.

In contrast, numbers of consultant medical microbiologists (CMMs) and virologists in the UK have risen only modestly.<sup>1</sup> CMM workload has escalated for a variety of reasons. First, the laboratory specimen workload is rising, typically by 5% each year<sup>2</sup> (Public Health Laboratory Service (PHLS) unpublished data). In addition, clinical workload has increased considerably, both in volume and complexity. At the same time, the demands on the infection control doctor (ICD) have escalated, partly as a result of specific infection control challenges, such as MRSA and *Clostridium difficile*, but also because of rising national requirements. Other factors include growing problems of antimicrobial resistance, the demands of clinical governance, and the need to set aside time for continuing professional development. The fact that medical microbiology is primarily a demand led speciality has led to increasing pressures on the time of CMMs.<sup>3</sup> To date, little effort has been made to identify priority areas for CMMs or to identify mechanisms by which clinical microbiological workload might be controlled.

"Clinical workload has increased considerably, both in volume and complexity"

A study was undertaken in the 10 clinical microbiology laboratories of the PHLS South West Group (PHLS SW) to examine CMM workload, focusing specifically on clinical, rather than analytical, activities. In addition to measuring total CMM weekly workload, the aim of the survey was to identify the time spent on different activities, to examine the way in which CMMs undertake their job, and the value they accord to different tasks, with a view to distinguishing between core tasks and those that could be accorded a lower priority, or shed.

## METHODS

A questionnaire seeking information on all major aspects of clinical and professional workload was sent to all CMMs in PHLS SW ( $n = 22$ ). The questionnaire was self administered and respondents were asked to estimate the time spent on activities rather than to keep a detailed diary. The estimates of time allocation were validated by a subset of four consultants who completed a four week diary exercise. For consultants not working full time as CMMs, the hours were scaled up pro rata. Consultants were also asked to identify in detail how they undertook various aspects of the job such as authorising, telephoning positive results, and attending ward rounds. Emphasis was placed on what aspects of the job they felt were most valuable. A consensus was deemed to exist if  $\geq 75\%$  of consultants shared the same view of the importance of any particular task or activity.

## RESULTS

### Response rate

Twenty of 22 eligible consultants completed and returned the questionnaire.

### Total hours worked

Hours worked ranged from 41 to 65 each week, excluding on call activities. Eleven of 20 respondents reported working in excess of 48 hours each week. Seventeen of 20 consultants reported a greater than 50% increase in workload in the past five years.

**Abbreviations:** CMM, consultant medical microbiologists; ICD, infection control doctor; ICN, infection control nurse; ICU, intensive care units; PHLS SW, Public Health Laboratory Service South West Group

**Table 1** Factors contributing to increased workload

Workload factor	No. of respondents identifying factor
Clinical advice and increasing patient complexity	10
Infection control requirements and problems	7
Trust expectations	5
Meetings	3
Management	3
Paperwork, bureaucracy	2
Audit	2
Clinical governance activities	2

**Table 2** Time spent on specific consultant activities

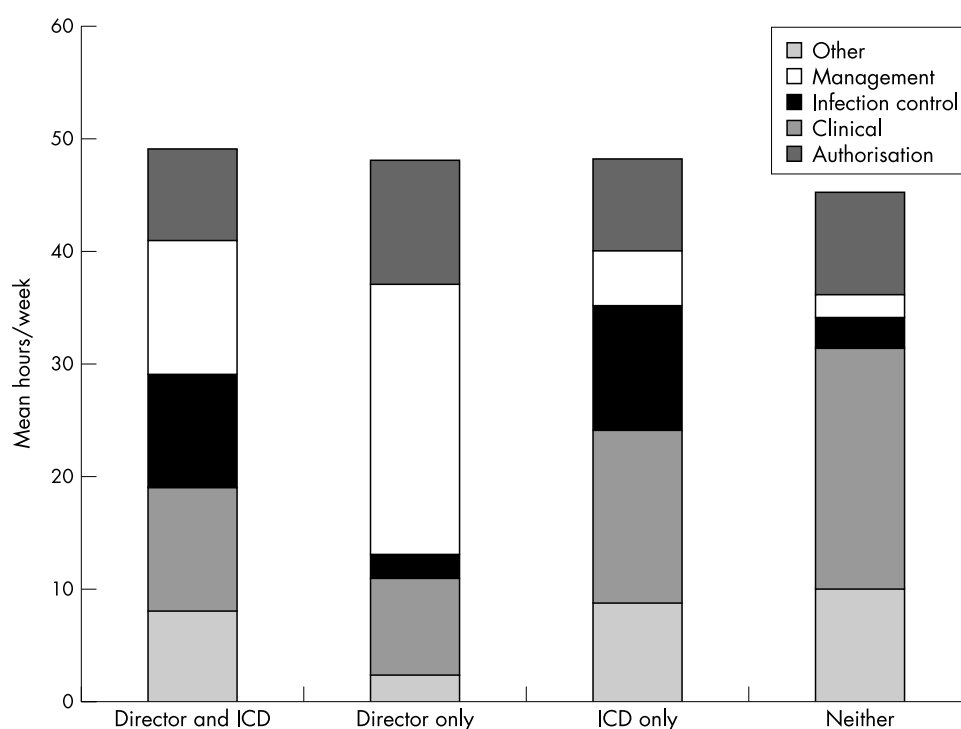
Task	Hours/week (median)	Hours/week (range)
Result authorisation	8	0–16
Clinical liaison	10	2–45
Infection control	6	1–16
Trust management	1.5	0–5
PHLS management	4	0–25
Public health	2.0	0–10
Research and development	1.0	0–20
CPD	1.0	0–4
Regional and national activities	1.0	0–5
Total hours	50	41–65

CPD, continuing professional development; PHLS, Public Health Laboratory Service.

### Factors contributing to increased workload

Consultants were asked to identify as free text responses those factors that had resulted in increased workload (table 1). Table 2 details the time spent on specific activities by responding CMMs.

Figure 1 shows the attribution of time to specific activities for consultants charged with carrying out specific activities and roles.

**Figure 1** Time attribution by roles. ID, infection control doctor.

### Numbers of specimens for each whole time equivalent member of consultant medical staff

There was no significant relation between hours worked each week by consultants and the numbers of specimens processed by the laboratory for each whole time equivalent member of the medical staff ( $p = 0.712$ ).

### Result authorisation

Figure 2 shows the variation in time spent on result authorisation and relates this to the time spent on other clinical activities. To compare laboratories, the total time spent on authorising by consultant staff in eight laboratories was related to specimen workload (fig 3).

Responses to detailed questions on specific clinical specimen related scenarios indicated that considerable rationalisation of authorisation has already occurred. There was a consensus that many results did not require authorisation by a CMM. Such results included negative urine cultures, negative MRSA screens, negative blood cultures, and negative genital swabs. In contrast, there was a lack of consensus as to whether consultant authorisation was required for negative cerebrospinal fluid specimens, hepatitis B immunity, and rubella susceptibility. The ability of existing laboratory computer systems to accept rule bases was one factor limiting further rationalisation of authorisation.

### Telephoning positive results

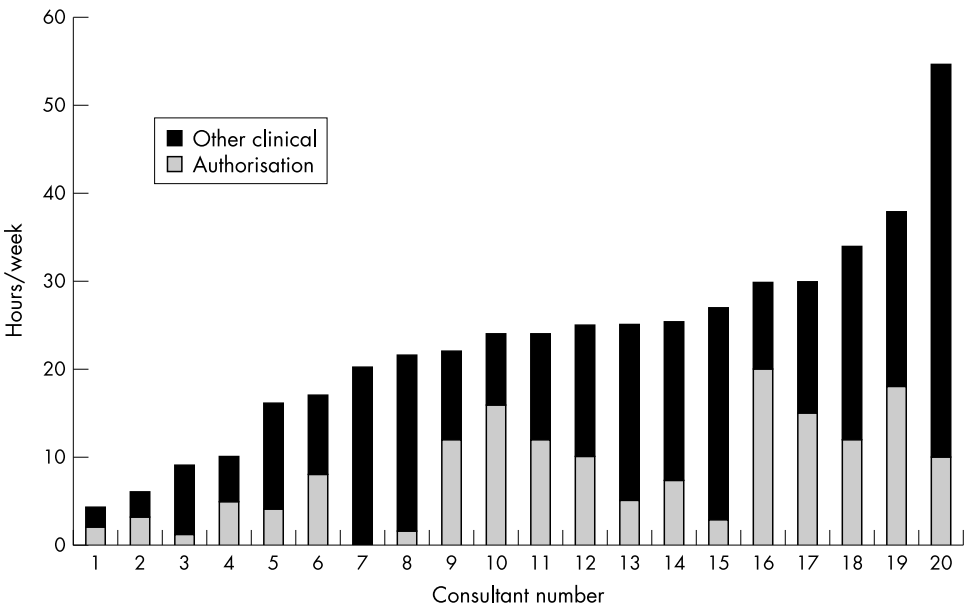
Table 3 provides data on telephoning positive results, contrasting real practice with the consultants' opinions of what they regard as valuable.

Eleven of 20 consultants indicated that they had electronic links to at least some general practitioners and 15 of 20 had electronic links to wards. Figure 4 compares telephone practice between consultants with and without such links.

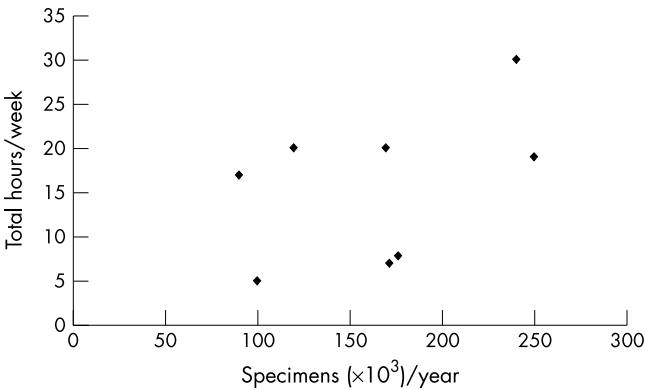
Seven CMMs indicated that they occasionally faxed results to general practitioners, whereas others stated that there was a policy prohibiting this.

### Telephone advice

Consultants estimated that they spent between two and 17 hours each week providing telephone advice to hospital staff (median, four hours). Nearly all consultants rated this as a core activity. The time spent on the provision of telephone



**Figure 2** Time attribution to authorisation and other clinical activities by individual consultant.



**Figure 3** Medical authorisation in eight laboratories.

advice to general practitioners ranged from one to five hours each week (median, two hours). Again this was viewed by most as a core activity.

**Ward rounds**

Figure 5 shows the numbers of CMMs attending designated specialist unit ward rounds. The time spent each week on ICU

ward rounds ranged from one to 10 hours (median, three to four hours) and the median frequency of visits was five each week.

The time spent on haematology ward rounds ranged from one to five hours each week (median, one hour) and the median frequency was one attendance each week.

The duration of time spent on neonatal unit ward rounds ranged from one to three hours each week and the median frequency ranged from once a week to daily.

**Self referral ward visits**

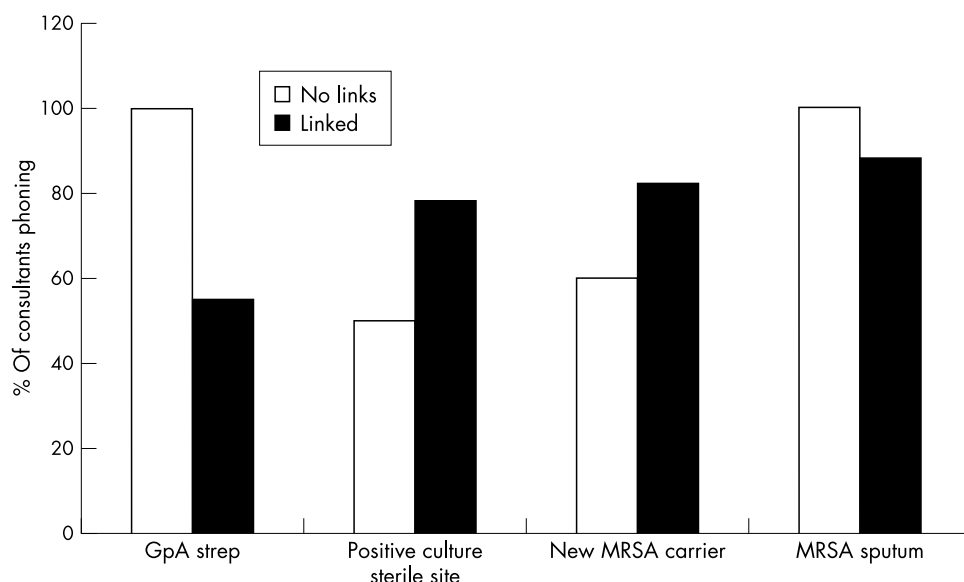
The frequency of ward visits to see individual patients ranged from once each week to five times each week (median, five times). The range of time spent on such ward visits ranged from one hour to 20 hours each week. Thirteen of 18 respondents indicated that this was a core activity.

Consultants were presented with a range of hypothetical clinical and laboratory scenarios to establish how they would respond. The degree of agreement varied considerably. Only two of 17 consultants who responded to this question indicated they would routinely see all patients with MRSA in sputum, whereas 13 of 20 would routinely see a patient with streptococci in blood cultures and suspected endocarditis. Only three of 20 consultants said that they would routinely

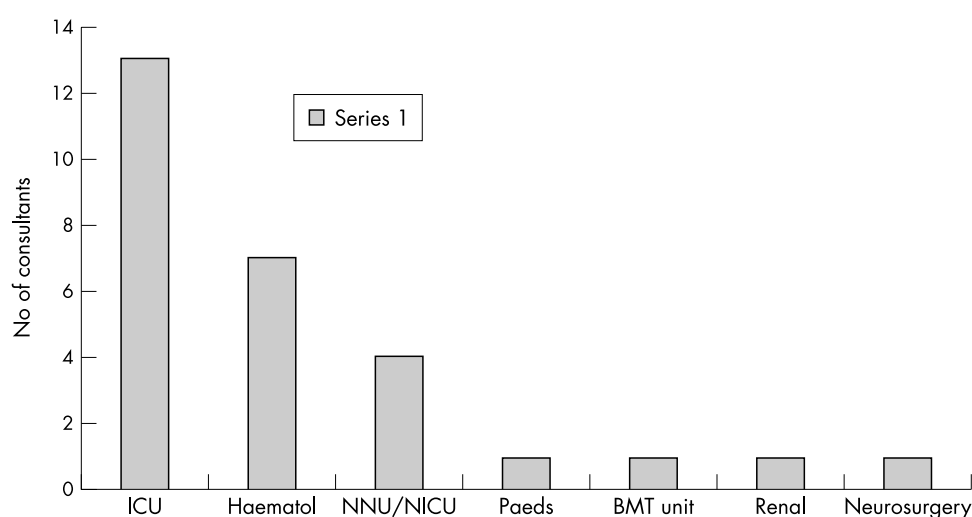
**Table 3** Telephoning results

Result	General practice		Hospital practice	
	% Phoned by CMM	Consensus on value of phoning by CMM	% Phoned by CMM	Consensus on value of phoning by CMM
Group A strep throat swab	20%	Not valuable	74%	No consensus
Group A streptococcus wound swab	68%	No consensus	90%	Valuable
Group A streptococcus HVS	74%	No consensus	85%	Valuable
Staph aureus sterile site	80%	Valuable	40%	Valuable
New MRSA carriage	35%	Not valuable	60%	No consensus
MRSA sputum	58%	No consensus	85%	No consensus
Salmonella in stool	53%	No consensus	95%	Valuable
Campylobacter in stool	28%	Not valuable	85%	Valuable
Escherichia coli O157	63%	No consensus	95%	Valuable
Parasites	50%	No consensus	90%	Valuable
New HIV positive	95%	Valuable	100%	Valuable
New hepatitis B	100%	Valuable	100%	Valuable
New hepatitis C	63%	No consensus	90%	No consensus
New hepatitis A	100%	Valuable	100%	Valuable
Positive mycoplasma	47%	No consensus	84%	Valuable
Positive Lyme	100%	Valuable	100%	Valuable

CMM, consultant medical microbiologist; HIV, human immunodeficiency virus; HVS, high vaginal swabs.



**Figure 4** Effect of electronic ward links. GpA, group A streptococcus.



**Figure 5** Ward rounds attended. BMT, bone marrow transplantation; ICU, intensive care unit; NICU, neonatal intensive care unit; NNU, neonatal unit; paeds, paediatric ward.

visit all patients with Gram negative rods in blood cultures, most indicated that they would only see the patient if the situation was complex or a visit was requested.

### Infection control

Twelve of 20 consultants were fulfilling the ICD role. The number of designated infection control sessions for ICDs ranged from none to four (median, two). The time spent on infection control activities varied. For ICDs, this ranged from two to 16 hours each week (median, 12 hours). For those who were not designated ICDs, the range was one to five hours (median, three hours).

CMMs were asked to identify whether one or more of a wide range of infection control related activities should be ICD

led or led by infection control nurses (ICNs) and table 4 shows the results.

There were some discrepancies between the perceived value of ICD involvement and real practice. For example, although there was consensus that ICNs should manage ward outbreaks of viral gastroenteritis, many CMMs (eight of 20) were actively involved. Conversely, although advice on new building projects was agreed to be valuable, actual input was low (nine of 20 CMMs).

### Public health activity

There was a very wide range of input by different CMMs with a similarly variable percentage of time spent on this activity. There was a consensus that general practitioner liaison,

**Table 4** Infection control activities

Consensus: ICD led	Consensus: ICN led	No consensus
Control of infection committee chair	Isolation advice	CSSD advice
Infection control team chair	Laundry advice	Clinical waste
Major outbreak	Disinfection advice	Inoculation injury
Medical staff education	Ward inspections	Ward outbreaks of MRSA
	Routine data collection	Updating policies
	Surveillance projects	Advice on equipment
	Ward outbreaks of gastroenteritis	
	Nursing staff education	

CSSD, central sterile supply department; ICD, infection control doctor; ICN, infection control nurse.

production of general practitioner newsletters, and involvement in major community outbreaks should all be core activities of a consultant microbiologist. There was no consensus on consultant involvement in attending Environmental Health Office meetings, minor community outbreaks, or authorisation of results of food and environmental specimens.

### On call

All the respondents undertook on call. Seventeen of 20 reported participating in rotas of one in two or one in three frequency. Weekend on call involved Saturday morning attendance for 19 of 20 but also 13 of 20 CMMs routinely went into the laboratory/hospital on Sunday mornings.

Numbers of telephone calls during an average weekend on call ranged from one to 50 (median, 10). There was a high degree of agreement regarding the value of providing a CMM on call service.

### DISCUSSION

The role of the consultant microbiologist has evolved considerably over the past 30 years. Laboratory management remains a key component for many, but involvement in benchwork has declined. Other functions including clinical liaison and infection control have expanded enormously. Although several studies have noted the increasing clinical aspect of the role of the medical microbiologist,<sup>4-7</sup> the precise details of the clinical and professional expectations of the CMM are still ill defined. Current job descriptions typically set out few, if any, fixed commitments such as attendance on specific ward rounds. This allows CMMs flexibility, but with the advent of clinical governance and performance appraisal there is a fast growing need for expectations to be more clearly defined. This, together with commitment to several fixed weekly sessions, would also provide trust senior managers with a better understanding of the contribution that can be made by their medical microbiologists.

There is a need to ensure that CMMs are not overloaded. The Royal College of Pathologists has issued broad guidelines on the range of activities that might be expected of consultant medical microbiologists and virologists,<sup>8</sup> but guidance is lacking on implementation and prioritisation in individual posts. Our study revealed that 11 of 20 CMMs worked hours in excess of the European Working Time Directive. Clinical pressures, infection control requirements, and trust expectations were the most important factors causing increasing time pressure.

*"Most consultant medical microbiologists in the survey regularly visited their main hospital base on both Saturday and Sunday mornings to deal with clinical problems"*

On call work is now a substantial commitment both in the frequency of rostering and the burden of calls. The fact that most CMMs in the survey regularly visited their main hospital base on both Saturday and Sunday mornings to deal with clinical problems highlights the nature and volume of the clinical workload.

The sections of the questionnaire examining specific aspects of CMM work highlighted several issues. Authorisation of results represents a major time commitment. The fact that some CMMs spent more time on authorisation than clinical liaison suggests an imbalance. There was consensus on some specimen result types that did not need to be authorised, but less evidence that respondents had followed their instincts by ceasing consultant authorisation of all low value specimen results. For some CMMs, limitations in laboratory computer systems had hampered attempts at further rationalising results authorisation. This appears to be a promising area for controlling workload.

### Recommended duties

We list below several observations and recommendations that could form the starting point for a wider professional discussion

- Time spent by consultant medical microbiologists (CMMs) in authorisation of results could be rationalised without loss of quality of service and with substantial time saving. Laboratories need good information management systems and information technology support to facilitate this
- Time is being spent unproductively by CMMs telephoning positive results. There are areas where this could be eliminated and, in addition, dialogue with users is necessary to identify those results that would be of value if telephoned. There is also a need to define those results that need to be telephoned by a consultant, rather than by clerical or technical staff
- The provision of clinical advice on the telephone is a core activity for CMMs and, ideally, availability should be maintained rather than being restricted to a limited number of hours each day. This may be difficult to achieve, particularly for single handed CMMs
- Clinical ward liaison is another key part of the CMM role. An agreed frequency of attendance at key ward rounds could be reflected in job plan
- Infection control doctors should not take on inappropriate tasks that could be undertaken by appropriately qualified nursing personnel. The consensus identified in our study is a useful starting point for dialogue with other professional groups
- Given the time pressures on CMMs, serious consideration needs to be given to limiting activities of these staff in work in such non-clinical areas as authorisation of food, water, and environmental specimens

Many consultants were telephoning positive results such as the presence of *Campylobacter* spp in stool samples, although they felt this was of very limited value. Disappointingly, the existence of electronic links, whether to wards or general practitioner surgeries, appeared to have had little effect on limiting calls. The results highlight the urgent need for better dialogue between laboratories and users to identify those results that users would find useful if telephoned. It was also clear that a more analytical approach would be required to determine who should undertake this task. Unless the CMM intended to speak directly to a clinician, hospital doctor, or general practitioner to discuss management, there seems no reason why results could not be telephoned by clerical or technical staff.

The workload arising from the need to provide a telephonic clinical consultative service was highlighted. Frequent interruptions of this kind make it extremely difficult to achieve other, more proactive, goals. However, there was general agreement that such availability forms a key part of the consultant role and that to limit availability to specific times would be damaging. In this aspect CMMs are a victim of their own success. Conversely, few other specialty consultants are so instantly available.

The attendance of CMMs on ward rounds was very variable, perhaps relating in part to other rôles and commitments. There was consensus on the fact that attendance on ward rounds such as those on intensive care units (ICUs), haematology units, and neonatal units forms a core activity of CMMs. We propose regular attendance at such ward rounds (probably daily for ICU, possibly two to three times a week for haematology and neonatal units) should be built into job plans as an explicit recognition of the clinical role of CMMs.

There was also variability in the responses of the CMMs regarding the selection of patients to be seen on their own ward visits. The difference in time commitment between the alternatives of providing telephone based advice about a patient, or visiting the ward, reading the notes, and seeing the



patient is great. There is a growing expectation that for a range of complex clinical situations, CMMs will play an active clinical role on the ward.

The considerable recent rise in both problems and what is expected of the infection control team are well documented.<sup>9</sup> In our study, we found that the consultant sessions allocated to infection control were inadequate to meet either the clinical need or the recommendations of the National Audit Office report.<sup>10</sup> More positively, the study identified a considerable consensus concerning allocation of specific tasks to either the ICD or the ICN. Given the extremely wide ranging infection control brief set out in some CMM job descriptions, such a consensus may be helpful in initiating a wider professional discussion.

There was considerable variation in the time devoted to public health microbiology. There was consensus that input into major outbreaks and primary care liaison, production of general practitioner newsletters, etc, was of considerable value. With growing clinical commitments, the involvement of CMMs in activities such as authorisation of food, water, and environmental specimens is probably inappropriate.

## ACKNOWLEDGEMENTS

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## Authors' affiliations

**T Riordan**, Public Health Laboratory, Church Lane, Heavitree, Exeter EX2 5AD, UK

**K Cartwright**, **M Logan**, Public Health Laboratory, Gloucestershire Royal Hospital, Great Western Road, Gloucester GL1 3NN, UK

**R Cunningham**, Public Health Laboratory, Derriford Hospital, Plymouth PL5 8DH, UK

**S Patrick**, Public Health Laboratory, Salisbury District Hospital, Salisbury, Wiltshire SP2 8BJ, UK

**T Coleman**, Public Health Laboratory, County Hospital, Hereford HR1 2ER, UK

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